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EXAMINER	
BEKELE, MEKONEN T	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/599,955	WHITEHEAD ET AL.
	Examiner	Art Unit
	MEKONEN BEKELE	2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/16/2010*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-55 are pending in this application.

Priority

2. Applicant's claim for domestic priority under 35 U.S.C 119(e) is acknowledged based on the provisional application 60562240, filed on 04/15/2004.

Drawings

3. The drawings filed on 10/13/2006 are accepted for examination.

Response to Amendment

4. Applicants' response to the last Office Action, filed 12/21/2010, has been entered and made of record.

Response to Argument

5. The Applicants' arguments regarding the rejection of claims 1-32, under 35 USC §101 are fully considered and they are persuasive. Therefore, the rejection of claims 1-32 under 35 USC §101 is expressly withdrawn.

6. In view of the Applicants' arguments and amendment, the rejection of claim 33 under 35 USC §101 is expressly withdrawn.

7. In view of the Applicants' arguments and amendment to the specification, the rejection of claims 9,10,19,22 and 29 under 35 USC §112 first paragraph is expressly withdrawn.

8 The Applicants' argue that the terminal disclaimer filed with the co-pending application No. 11/831521 obviates the obviousness type double patenting objection raised with the instant application. However, the non-statutory, obviousness-type double patenting rejection in connection with claims 1-4, 6, 8, 14, 8-19 ,30 ,33 and 34 based on claims 1-5 and 7-11 of co-pending US application No.11/831521 is maintained. Since the terminal disclaimer of the co-pending Application **is not approved**, **because the application number 10/599,955 filing date is incorrectly filed.**

9. At page 28, claims 1 and 33, Applicants' substantially argue "as understood Oohara, does not teach or suggest this claim 1 feature. Specifically, the Applicants argue "neither saturation C before conversion nor the threshold α depends on (or specifically determines) the number of pixels between the corresponding pixel (i.e. the pixel being converted) and the edge of the saturation region. Thus, as understood, Oohara fails to disclose the feature of a magnitude of each pixel's adjustment being dependent, at least in part, on "a number of pixels between the corresponding pixel and an edge of the saturation region" as recited in the independent claims of this application.

As above argument [9], the Examiner respectfully disagree with the Applicants based on the following reasons:

Oohara Specifically teaches a saturation detecting means for detecting saturation at every pixel in a digital color image (abstract). This statement indicates the saturation detection process is carried out in both flat region and edge region of the digital image. Since a digital image is composed of flat and edge regions. In col. 7 lines 25-31, Oohara teaches the distribution of saturations in the input image is automatically extracted, so as to determine the

threshold for deciding a saturation suppressed area based on the distribution of saturations. In this way, in order to obtain a color image improved in vividness and presenting feeling of sharpness, the saturation contrast is automatically improved. This statement teaches that the saturation suppressed area includes the edge region of the digital image, because in image processing community it is well known that a sharpening is a technique in which the edges within the image area are sharpened to improve the visual quality of an image.

And, in col. 7 lines 20-30, Oohara teaches the threshold determination means for determining a suitable threshold based on the saturation inside the predetermined area. The predetermined area corresponds to the edge region of the digital image when the suitable threshold is selected in order to generate a sharpened image. Further, Oohara teaches a function that allows a user, when determining the predetermined threshold, to designate at least one of a number and ratio of the pixels or coordinate points having saturation equal to or smaller than the threshold, based on the detected distribution of saturations may be added.

Therefore, based on the above discuss and as best understood by Examiner, Oohara's threshold α used based on a number or ratio of pixels has bearing on the location of the edge of the saturation area relative to any particular pixel in the area, and consequently "a magnitude of each adjustment dependent, at least in part, on a number of pixels between the corresponding pixel and an edge of the saturation".

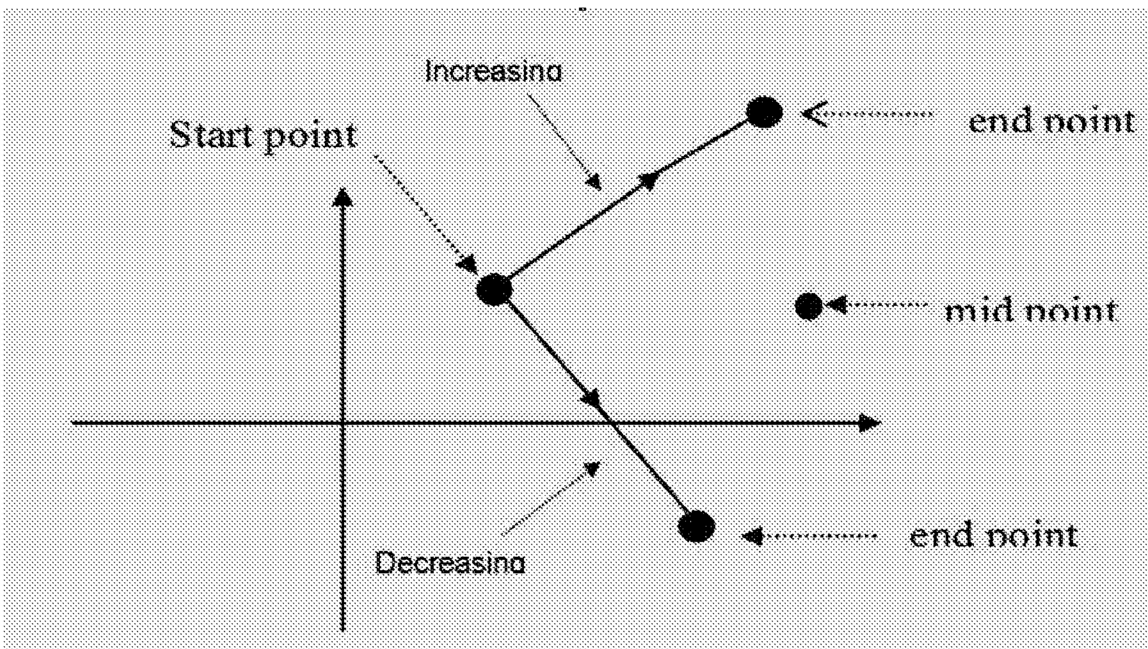
Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claim 9 recite "the function is one of linearly monotonically increasing and linearly monotonically decreasing from the start pixel toward a pixel located substantially midway

between the start pixel". It is not clear how a function linearly monotonically increasing and linearly and monotonically decreasing from the same start pixel and move toward to the pixel located substantially mid way between the start pixel and the end pixel. Because, as best understood by Examiner, when a function is linearly monotonically increasing and linearly monotonically decreasing from the start point the function diverges to two different end points (or $+\infty$ and-∞), and thus, the function is not converge to the midpoint as shown in an example given below:



Appropriate correction or clarification is required.

Double Patenting

11. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined

application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

12. *Claims 1-4, 6, 8, 14, 18-19, 30, 33 and 34 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 and 7-11 of the copending application No. 11/831521 respectively.*

Current *application No. 10/599955.*	***Copending* Application No. 11/831521**
1. A method for converting image data of an image from a lower bit depth representation to a higher bit depth representation, the image having a saturation region wherein a color model value of each individual pixel in the saturation region is one of: above an upper saturation threshold and below a lower	**1**. A signal processing unit configured to convert image data from a lower bit depth representation to a higher bit depth representation, the signal processing unit comprising: a processor configured to identify pixels in a saturation region wherein a color model value of each individual pixel in the

saturation threshold; the method comprising: identifying pixels in the saturation region and adjusting the color model value of each of the individual pixels in the saturation region by a corresponding adjustment, a magnitude of each adjustment dependent, at least in part, on a number of pixels between the corresponding pixel and an edge of the saturation region	saturation region is one of: above an upper saturation threshold and below a lower saturation threshold; and adjust the color model value of individual pixels in the saturation region by a corresponding adjustment, a magnitude of each adjustment dependent, at least in part, on a number of pixels between the corresponding pixel and an edge of the saturation region.
2. identifying pixels in the saturation region by scanning the color model values of pixels in the image data along a first scan axis to determine a start pixel at one edge of a saturation region and an end pixel at another edge of the saturation region.	**2**. the processor is configured to identify pixels in the saturation region by scanning the color model values of pixels in the image data along a first scan axis to determine a start pixel at one edge of a saturation region and an end pixel at another edge of the saturation region.
3. the processor is configured to determine the magnitude of each adjustment based, at least in part, on a function of the number of pixels between the corresponding pixel and the edge of the saturation region, wherein the function has an extremum in	**3.** determining the magnitude of each adjustment based, at least in part, on a function of the number of pixels between the corresponding pixel and the edge of the saturation region, wherein the function has an extremum in the saturation region.

the saturation region.	
4. identifying pixels in the saturation region by scanning the color model values of pixels in the image data along a first scan axis to determine a start pixel at one edge of a saturation region and an end pixel at another edge of the saturation region.	**4.** the processor is configured to identify pixels in the saturation region by scanning the color model values of pixels in the image data along a first scan axis to determine a start pixel at one edge of a saturation region and an end pixel at another edge of the saturation region.
6. the function comprises a parabola having a vertex located substantially midway between the start pixel and the end pixel.	**5.** the function comprises a parabola and the processor is configured to set a vertex of the parabola to be substantially midway between the start pixel and the end pixel.
7. the processor is configured to determine the magnitude of each adjustment on the basis of at least one of: a gradient between the color model values of the start pixel and at least one pixel preceding the start pixel and a gradient between the color model values of the end pixel and at least one pixel following the end pixel.	**8.** the magnitude of the function at the extremum is determined on the basis of at least one of: a gradient between the Color model values of the start pixel and at least one pixel preceding the start pixel and a gradient between the color model values of the end pixel and at least one pixel following the end pixel.
14. identifying pixels in a saturation region, and determining the magnitude of each adjustment based, at least in part, on a number of pixels in the saturation region	**8**. determine a number of pixels in the saturation region and to determine the magnitude of an adjustment based, at least in part, on the number of pixels in the

	saturation region
18. determining the magnitude of each adjustment based, at least in part, on: detecting a lens flare pattern surrounding the saturation region; and using a model of the lens flare pattern to predict color model values of the pixels in the saturation region.	**9**. the processor is configured to determine the magnitude of an adjustment based, at least in part, on detecting a lens flare pattern surrounding the saturation region; and predict color model values of pixels in the saturation region based at least in part upon a model of the lens flare pattern.
19. initially adjusting the color model values of the pixels in the image data to form an intermediate higher bit depth representation of the image data and wherein adjusting the color model value of each of the individual pixels in the saturation region is performed on pixels of the intermediate higher bit depth representation.	**10.** the processor is configured to adjust the color model values of the pixels in the image data to form an intermediate higher-bit-depth representation of the image data and wherein adjusting the color model value of individual pixels in the saturation region is performed on pixels of the intermediate higher bit depth representation.
30. adjusting the color model value of each of the individual pixels in the saturation region by scaling the color model value of each of the individual pixels in the saturation region by a corresponding scaling factor.	**11.** the processor is configured to scale the color model values of individual pixels in the saturation region by corresponding scaling factors

Claim 33 is rejected the same as claim 1 except claim 33 is directed to computer program claim. Thus, arguments analogous to that presented above for claim 1 is applicable to claim 33.	
Claim 34	Claim 1
Claims 35-37,48 and 52	Claims 2-4 and 8-9

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35U.S.C.102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. *Claims 1,33 and 34 are rejected under 35 U.S.C. 102 (b) as being anticipated by Oohara, Akemi (hereafter Oohara), US Patent No.: 7286702 B2, PCT Pub.: date May 15, 2003.*

As to claim 1, Oohara teaches a method for converting image data of an image from a lower bit depth representation to a higher bit depth representation **(col.6 lines 62-67, Oohara specifically teaches the color image processor with a saturation detector. Wherein saturation is detected at every pixel so as to effect <u>saturation suppression for the areas with low saturations</u>, whereby it is possible to produce a <u>good color image with enhanced feeling of depth and feeling of sharpness</u>)**, the image having a saturation region wherein a color model value of each individual pixel in the saturation region is one of: above an upper saturation threshold and below a lower saturation threshold**(col.3 lines 25-30, the saturation conversion control means reduces saturation for a pixel at which the detected**

saturation by the saturation detecting means is smaller than a predetermined threshold, and the saturation conversion control means may enhance saturation at a pixel at which the detected saturation by the saturation detecting means is greater than a predetermined threshold. The predetermined threshold is calculated based on the distribution saturation in the predetermined area of the image)the method comprising:

identifying pixels in the saturation region **(Figs. 6 and 7, col. 3 lines 20-25, Oohara specifically teaches a color image processor for detecting saturation at every pixel in a digital color image, where a distribution of saturations is contained in a predetermined area of the image)** and

adjusting the color model value of each of the individual pixels in the saturation region by a corresponding adjustment **(col.3 lines 25-30, the saturation conversion control means reduces saturation for a pixel at which the detected saturation by the saturation detecting means is smaller than a predetermined threshold, and the saturation conversion control means may enhance saturation at a pixel at which the detected saturation by the saturation detecting means is greater than a predetermined threshold)**, a magnitude of each adjustment dependent, at least in part, on a number of pixels between the corresponding pixel and an edge of the saturation region**(Fig. 1, col.3 lines 37-42, when determining the predetermined threshold, the user can designate, at least, the number or ratio of the pixels having saturation equal to or smaller than the threshold, based on the detected distribution of saturations in the predetermined area of the image. Wherein, the predetermined area includes the edge (boundary) of saturation distribution region).**

Claim 33 is rejected the same as claim 1 except claim 33 is directed to computer program claim. Thus, arguments analogous to that presented above for claim 1 is applicable to claim 33.

Claim 34 is rejected the same as claim 1 except claim 34 is directed to a system claim. Thus, arguments analogous to that presented above for claim 1 is applicable to claim 34.

Claim Rejections - 35 USC § 103

The following is a quotation of the 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained thought the invention is not identically disclosed or described as set forth in section 102 of this title, if the difference between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. *Claims 2-18, 23-26,35-44 and 48-52 are rejected under 35 U.S.C 103(a) as being unpatentable over Oohara, Akemi (hereafter Oohara), US Patent No.: 7286702 B2, PCT Pub.: date May 15, 2003, in view Jarman et al., (hereafter Jarman), PCT Pub. No.: WO/2003/071781, published on 08/28/2003.*

As to claim 2, Oohara teaches identifying pixels in the saturation region by scanning the color model values of pixels in the image data **(Fig. 16, col.13 lines 49-53, Oohara specifically teaches color image processor 105 that includes saturation detecting means 200, where saturation detecting means determines the saturation at the pixel first, based on the RGB signal for each pixel);**

However, it is noted that Oohara does not specifically teach “along a first scan axis to determine a start pixel at one edge of a saturation region and an end pixel at another edge of

the saturation region" *although Oohara teaches a predetermined saturation area of the digital image, and a saturation detector that detects saturated pixels in the predetermined area.*

On the other hand a method of correcting red-eye features in a digital image includes generating a list of possible features by scanning through each pixel in the image searching for saturation profiles characteristic of red-eye features of Jarman teaches identify pixels in the saturation region by scanning the color model values of pixels in the image data**(Abstract, generating a list of possible features by scanning through each pixel in the image searching for saturation profiles characteristic)** along a first scan axis to determine a start pixel at one edge of a saturation region and an end pixel at another edge of the saturation region**(page 19, lines 24-30, Jarman teaches a type one feature detection algorithm that scans each row of pixels in the image, and determine the saturation and lightness pixels in the image. Specifically the algorithm determines the initial pixel that indicates the starting point of the saturation in the image based on rising edge, and then determines the final pixel that indicates the ending point of the saturation based on falling edge).**

Oohara and Jarman combinable because they are directed to a technique of image saturation detection and correction (Oohara: Abstract, Jarman: Abstract)

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the technique of identifying a flare region of pixels having high lightness and low saturation (page 10 lines 1-2).

The suggestion/motivation for doing so would have been decreasing the lightness of the pixels in the flare region and increasing the saturation and lightness of the pixels in the simulated highlight region (page 10 lines 3-5).

Therefore, it would have been obvious to combine Oohara with Jarman to obtain the invention as specified in claim 2.

As to claim 3, Oohara teaches determining the magnitude of each adjustment based, at least in part, on a function of the number of pixels between the corresponding pixel and the edge of the saturation region (**regarding this section of claim3, all claimed limitations are set forth and rejected as per discussion for claim 1 above)**, wherein the function has an extremum in the saturation region**(col. 10 lines 27-40, Oohara teaches a saturation conversion function F(x) which is used in the saturation conversion control means 300. The function includes parabolic and linear functions. Clearly the parabolic function has a minimum (extremum) saturation value at its vertex).**

Regarding claim 4, all claimed limitations are set forth and rejected as per discussion for claim 2.

As to claim 5, Oohara teaches the extremum of the function is located substantially midway between the start pixel and the end pixel**(col. 10 lines 27-40, Oohara teaches a saturation conversion function F(x) that <u>comprises a parabola</u>, and which is used in the saturation conversion control means 300. Clearly the parabolic function has a minimum (extremum) saturation value at its vertex which is located midway between the stating and ending points of the parabola).**

As to claim 6, Oohara teaches the function comprises a parabola having a vertex located substantially midway between the start pixel and the end pixel(regarding claim 6, all claimed limitations are set forth and rejected as per discussion for claim 5).

As to claim 7, Oohara teaches the magnitude of the function at the extremum depends, at least in part, on a number of pixels between the start pixel and the end pixel**(col. 10 lines 27-40, Oohara teaches a saturation conversion function F(x) which is used in the saturation conversion control means 300. The function includes parabolic and linear functions. The parabolic function is a function of a predetermined threshold. Wherein, the threshold is depending on the number or ratio of the pixels having saturation. Clearly the parabolic function has a minimum (extremum) saturation value at its vertex (which is located midway between the starting and ending point of the parabola)).**

As to claim 8, Jarman teaches the magnitude of the function at the extremum is determined on the basis of at least one of: a gradient between the Color model values of the start pixel and at least one pixel preceding the start pixel **(page 19, lines 25-30, page 21 lines 1-25, Jarman specifically teaches saturation detection algorithm based on the rising edge and falling edge of pixels value**. The gradient between the color model values of the start pixel and at least one pixel preceding the start pixel **corresponds to the rising edge deferens between a current pixel and the preceding neighbor (the pixel to its left)**l and a gradient between the color model values of the end pixel and at least one pixel following the end pixel**(page 19, lines 28-30, page 20 lines 1-5, page 21 lines 1-25, once a rising edge has been identified, that pixel and the following pixels (assuming they have a similarly high saturation and lightness) are recorded, until an abrupt drop in saturation is reached,**

making the other edge of the highlight. This is known as a "falling edge". The gradient between the color model values of the end pixel and at least one pixel following the end pixel corresponding to the falling between **corresponds to the falling edge deferens between a current pixel and the neighbor pixel to its right)**.

As to claim 9, Oohara teaches the function is one of linearly monotonically increasing and linearly and monotonically decreasing from the start pixel toward a pixel located substantially midway between the start pixel and the end pixel (col.7 lines 27-40, **Oohara specifically teach a linearly increasing function and a parabolic type function associated to saturation conversion process)**, and wherein the function is the other of linearly monotonically increasing and linearly monotonically decreasing from the pixel located substantially midway between the start pixel and the end pixel toward the end pixel **(col. 10 lines 27-40, Oohara teaches a saturation conversion function F(x) that comprises a parabola, and which is used in the saturation conversion control means 300. The parabolic function has a minimum (extremum) saturation value at its vertex which is located midway between the starting and ending points of the parabola, and the function is decreasing from the starting point of the parabola toward the vertex, and increasing from the vertex toward the ending point of the parabola.** The starting pixel and the ending pixel **correspond to the pixel located at starting point of the parabola and the pixel located at the ending point of the parabola).**

As to claim 10, Jarman teaches a value of the function is unity for at least one of: the start pixel and the end pixel **(page 60 lines 22-25, Jarman a multiplier associated with pixels**

saturation and that includes a unit factor. Wherein, if the multiplier is 1, which means full correction, the saturation will be changed to a predetermined saturation value).

As to claim 11, Oohara teaches determining the magnitude of each adjustment based, at least in part, on a number of pixels between the start pixel and the end pixel **(Fig. 1, col.3 lines 37-42, as discussed in claim 1 above, when determining the predetermined threshold, the user can designate, at least, the <u>number or ratio of the pixels</u> having saturation equal to or smaller than the threshold, based on the detected distribution of saturations in the predetermined area of the image. Wherein, the predetermined area includes the starting and ending (boundary) pixels of saturation distribution region).**

Regarding claim 12, all claimed limitations are set forth and rejected as per discussion for claim 1 and 8.

Regarding claim 13, all claimed limitations are set forth and rejected as per discussion for claims 1 and 8.

As to claim 14, Oohara teaches determining the magnitude of each adjustment based, at least in part, on a number of pixels in the saturation region **(col.3 lines 37-42, as discussed in claim 1 above, Oohara teaches when calculating the predetermined threshold, the user can designate, at least, the <u>number or ratio of the pixels having saturation equal to or smaller than the threshold</u>, based on the detected distribution of saturations in the predetermined area of the image)**.

As claim 15, Jarman teaches determining the magnitude of each adjustment based, at least in part, on a gradient between the color model values of at least one pixel on the edge of the saturation region and at least one pixel outside of the saturation region **(page 7, lines 10-20, page 19, lines 24-30, see a saturation detection algorithm, and see also a SatMultiplier algorithm, where the SatMultiplier is the saturation multiplier used to correct the saturation).**

As to claim 16, Oohara teaches determining the magnitude of each adjustment based, at least in part **(col.3 lines 25-30, the saturation conversion control means configured to adjust the saturation of pixels)**, on one or more temporally previous values of the color model value for the corresponding pixel **(col. 11 equation 7**, one or more temporally previous values of the color model **corresponds to equation 7)**

As to claim 17, Oohara teaches determining the magnitude of each adjustment based **(col.3 lines 25-30, the saturation conversion control means configured to adjust the saturation of pixels)**, at least in part, on one or more other color model values for the corresponding pixel **(col. 11 equations 8 and 9,** one or more other color model values for the corresponding pixel corresponds to equations 8 and 9**)**

As to claim 18, Jarman teaches determining the magnitude of each adjustment based, at least in part, on: detecting a lens flare pattern surrounding the saturation region; and using a model of the lens flare pattern to predict color model values of the pixels in the saturation region **(claim 35, page 10 lines 1-5,identifying a flare region of pixels having high lightness and low saturation; eroding the edges of the flare region to determine the simulated highlight**

region; decreasing the lightness of the pixels in the flare region; and increasing the saturation and lightness of the pixels in the simulated highlight region).

As to claim 23, Jarman teaches scanning color model values of pixels in the image data along a first scan axis comprises determining start and end pixels for one or more additional saturation regions within a line of pixels**(page 26 lines 22-30, page 27 lines 1-5, page 27 the SignificantMinimum algorithm, Jarman specifically teaches to scan through the image looking for a pixel 102 with saturation above some threshold, then the algorithm scan left from the high saturation pixel 102, to <u>determine the approximate beginning of the saturation rise</u>. This is done by searching for the first significant minimum in saturation to the left of the high saturation pixel 102.The algorithm will then scan right from the high saturation pixel 102, seeking a significant minimum 104 in saturation that <u>marks the end of the feature</u>.** The more additional saturation regions **corresponds to the areas of the digital color image with high and low saturations),** wherein the color model value of each individual pixel in the one or more additional saturation regions is one of: above the upper saturation threshold and below the lower saturation threshold **(scan through the image looking for a pixel 102 with high saturation above some threshold).**

Regarding claim 24, all claimed limitations are set forth and rejected as per discussion for claim 1 and 23.

As to claim 25, Jarman teaches repeating scanning color model values for a plurality of lines of pixels of the image data along the first scan axis **(as discussed in claim 2 above, the feature detection algorithm scans each row of pixels in the image, looking for small**

areas of light, highly saturated pixels) and adjusting the color model value of each of the individual pixels in each saturation region until the entire image has been scanned and adjusted along the first scan axis (**page 57 lines 9-15,see the Saturation Multiplier algorithm, for each such pixel, the algorithm calculates a multiplier for its saturation value – some need substantial de-saturation to remove redness, others need little or none. The <u>multiplier determines the extent of correction).</u>**

As to claim 26, Jarman teaches repeating scanning color model values for a plurality of lines of pixels of the image data along a second scan axis and adjusting the color model value of each of the individual pixels in each saturation region until the entire image has been scanned and adjusted along the second scan axis (**page 19 lines 5-10, although it is possible to search for <u>all types of feature in one scan</u>, it is computationally simpler to scan the image in multiple phases. Each phase searches for a single, distinct type of feature. Where the features are further categorized into four "sub-categories" of the feature, labeled according to the highest value of saturation and lightness within the feature. Further it is a well known technique scanning using horizontal, vertical and diagonal scanning axis).**

Claims 35-38 are rejected the same as claims 2-5 respectively except claims 35-38 are directed to a system claims. Thus, arguments analogous to those presented above for claims 2-5 are respectively applicable to claims 35-38.

Claims 39-41 are rejected the same as claims 7, 8 and 10 respectively except claims 39-41 are directed to a system claims. Thus, arguments analogous to those presented above for claims 7, 8 and 9 are respectively applicable to claims 39-41.

Claims 42-44 are rejected the same as claims 13,11 and 12 respectively except claims 42-44 are directed to a system claims. Thus, arguments analogous to those presented above for claims 13, 11 and 12 are respectively applicable to claims 42-44.

Claims 45 and 46 are rejected the same as claims 25 and 26 respectively except claims 45 and 46 are directed to a system claims. Thus, arguments analogous to those presented above for claims 25 and 26 are respectively applicable to claims 45 and 46.

Claims 48-52 are rejected the same as claims 14-18 respectively except claims 48-52 are directed to a system claims. Thus, arguments analogous to those presented above for claims 14-18 are respectively applicable to claims 48-52.

15. *Claims 19-22, 27-32 and 53-55 are rejected under 35 U.S.C 103(a) as being unpatentable over Oohara, US Patent No.: 7286702 B2, PCT, in view Jarman et al., PCT Pub. No.: WO/2003/071781, further in view Ulichney et al., (hereafter Ulichney), US Patent No.: US 6038576 A, published on March 14, 2000.*

As to claim 19, Oohara teaches initially adjusting the color model values of the pixels in the image data to form an intermediate higher bit depth representation of the image data **(col.6 lines 62-67, Oohara specifically teaches the color image processor with a saturation**

detector. Wherein, saturation is detected at every pixel so as to effect saturation suppression for the areas with low saturations, whereby it is possible to produce a good color image with enhanced feeling of depth and feeling of sharpness. The intermediate higher-bit-depth representation of the image data **corresponds to the good color image with enhanced feeling of depth)**;

However, it is noted that both Oohara and Jarman do not specifically teach "wherein adjusting the color model value of each of the individual pixels in the saturation region is performed on pixels of the intermediate higher bit depth representation"**.**

On the other hand the Bit-depth increase by bit replication of *Ulichney teaches* wherein adjusting the color model value of each of the individual pixels in the saturation region is performed on pixels of the intermediate higher bit depth representation **(Fig. 5A-5C, col.6 lines 12-20, lines 56-67).**

Oohara, Jarman *and Ulichney* are combinable because they are from the same field of endeavor.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to incorporate the technique of bit-depth increasing by bit replication into saturation correction technique of *Oohara.*

The suggestion/motivation for doing so would have been to increase the bit-depth of the image.

Therefore, it would have been obvious to combine *Oohara with Ulichney* to obtain the invention as specified in claim 19.

As to claim 20, Jarman teaches initially adjusting the color model values of the pixels in the image data comprises at least one of: scaling the color model values of the pixels in the image data; and offsetting the color model values of the pixels in the image data**(page 7 lines 4-6, page 8 lines 17-24, Jarman specifically teaches a saturation multiplier, wherein the saturation multiplier configured to modify the saturation of each pixel in the rectangle by an amount determined by the saturation multiplier of that pixel.** The scaling factors **correspond to the saturation multiplier).)**

As to claim 21, Jarman teaches scaling the color model values of the pixels in the image data and wherein scaling color model values of the pixels in the image data is uniform as between pixels in the image data(**page 57 lines 19-15, and Figure 26 illustrates the pixels for which the saturation multiplier is smoothed**)

Regarding claim 22, all claimed limitations are set forth and rejected as per discussion for claim 19.

As to claim 27, Jarman teaches determining combining color model values of image data scanned and adjusted along the first scan axis with color model values of image data scanned **(see claim 25 above);**

However, it is noted that both Oohara and Jarman do not specifically teach “adjusted along the second scan axis to form the higher bit depth representation”.

On the other hand *Ulichney teaches* adjusted along the second scan axis to form the higher bit depth representation **(Abstract, col.6 lines 12-24)**

As to claim 28, Jarman teaches combining color model values comprises obtaining an average of color model values **(page 11 lines 15- 20)** of image data scanned and adjusted along the first scan axis with color model values of image data scanned and adjusted along the second scan axis **(page 19 lines 5-10, although it is possible to search for <u>all types of feature in one scan</u>, it is computationally simpler to scan the image in multiple phases. Each phase searches for a single, distinct type of feature. Where the features are further categorized into four "sub-categories" of the feature, labelled according to the highest value of saturation and lightness within the feature).**

As to claim 29, Jarman teaches combining color model values comprises obtaining an average of color model values of image data scanned and adjusted along the first scan axis **(page 11, lines 15-20, determine the mean of the hue, luminance and/or saturation of the pixels);**

However, it is noted that both Oohara and Jarman do not specifically teach “with color model values of image data scanned and adjusted along the second scan axis to obtain intermediate values and blurring groups of two or more adjacent pixels of the intermediate values to form the higher bit depth representation”

On the other hand Ulichney teaches with color model values of image data scanned and adjusted along the second scan axis to obtain intermediate values and blurring groups of two or more adjacent pixels of the intermediate values to form the higher bit depth representation **(Abstract, col. 6 lines 12-20)**

As to claim 30, Jarman teaches the processor is configured to scale the color model values of individual pixels in the saturation region by corresponding scaling factors **(page 7 lines 4-6, page 8 lines 17-24, Jarman specifically teaches a saturation multiplier, wherein the saturation multiplier configured to modify the saturation of each pixel in the rectangle by an amount determined by the saturation multiplier of that pixel.** The scaling factors **correspond to the saturation multiplier).**

As to claim 31, Oohara teaches the color model values comprise a mathematical combination of other color model values **(col.11 equations 7-24).**

As to claim 32, Oohara teaches, after adjusting the color model values of the individual pixels in the saturation region (**see claim 1 above);**

However it is noted that both Oohara and Jarman do not specifically teach "*further adjusting the color model values of all of the pixels in the image data to maximize the range of the color model values in the higher bit depth representation*" although Oohara suggests saturation *suppression technique for the areas with low saturations that produce a good color image <u>with enhanced feeling of depth and</u> feeling of sharpness (see abstract);*

On the other hand Ulichney teaches adjusting the color model values of all of the pixels in the image data to maximize the range of the color model values in the higher bit depth representation **(Abstract, col.6 lines 11-22).**

Claims 47 and 53-55 are rejected the same as claims 27 and 30-32 respectively except claims 47 and 53-55 are directed to a system claims. Thus, arguments analogous to those presented above for claims 27 and 30-32 are respectively applicable to claims 47 and 53-55.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact information

Any inquiry concerning this communication or earlier communication from the examiner should be directed to Mekonen Bekele whose telephone number is 571-270-3915. The examiner can normally be reached on Monday -Friday from 8:00AM to 5:50 PM Eastern Time. If attempt to reach the examiner by telephone are unsuccessful, the examiner's supervisor AHMED SAMIR can be reached on **(**571)272-7413**.** The fax phone number for the organization where the application or proceeding is assigned is 571-237-8300. Information regarding the status of an application may be obtained from the patent Application Information Retrieval (PAIR) system. Status information for published application may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished application is available through Privet PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have question on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866.217-919 (tool-free)

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